CLAIMS

1. A system for web inspection of a web, the system comprising:

2   a plurality of smart cameras, each smart camera for detecting a plurality

of web flaws from a streaming video signal, each smart camera

4   having means for generating flaw image data and flaw location

data;

6   a host computer for controlling the low contrast web inspection system

and for accepting and displaying the flaw image data and the flaw

8   location data; and

an ethernet for connecting the plurality of smart cameras to the host

10   computer.

2. The system of claim 1, wherein each smart camera of the plurality of smart

2 cameras comprises:

a line scan camera for generating a pixel representation of a portion of

4   the web;

a lighting uniformity and pixel sensitivity correction means for correcting

6   each pixel of the pixel representation and for providing a corrected

pixel representation;

8   a web edge detector for detecting at least one edge of the web;

a multi-pipeline pre-processor for filtering the corrected pixel

10   representation, the multi-pipeline preprocessor generating a

prioritized data stream of potential flaws;

12   a run length encoder for generating location data regarding a location of

each group of the potential flaws in a cross direction;

14   a blob detector for generating block data regarding the location of blocks

of the potential flaws along a machine direction; and

16   an inspect/reject analyzer for determining actual flaw data from the

prioritized data stream of potential flaws.

3. The system of claim 2, wherein the multi-pipeline processor comprises:

2 a plurality of filters for averaging the corrected pixel representation over a distance of the web along a machine direction of the web;

4 a plurality of adaptive background subtraction channels connected to the plurality of filters;

6 a plurality of thresholders, each thresholder of the plurality of thresholders connected to an output of an adaptive background subtraction

8 channel of the plurality of adaptive background subtraction channels, each thresholder for grouping a subtracted pixel

10 representations; and

a priority logic circuit for prioritizing the outputs of each of the plurality of

12 thresholders.

4. The system of claim 3, wherein the plurality of filters comprises:

2 a background filter;

a machine direction streak filter;

4 a cross direction streak filter; and

a small flaw filter.

5. The system of claim 3, wherein the plurality of thresholders comprises:

2 a single pixel flaw detector;

a uniformity detector;

4 a machine direction streak detector;

a cross direction streak detector; and

6 a small flaw detector.

6. The system of claim 1, wherein each smart camera of the plurality of smart

2   cameras detects the plurality of web flaws from the streaming video signal at a

contrast approaching a signal noise level.

7. A method for low contrast web inspection of a web, the method comprising

2   the steps of:

providing at least on smart camera for inspecting at least a portion of the

4   web;

generating flaw image data and flaw location data;

6   transmitting the flaw image data and flaw location data over an ethernet;

displaying the flaw image data and flaw location data.

8. The method of claim 7, wherein the step of generating flaw image data and

2   flaw location data comprises the steps of:

generating a pixel representation of a portion of the web;

4   correcting the pixel representation for a lighting uniformity and a pixel

sensitivity;

6   filtering the corrected pixel representation utilizing a plurality of filters;

grouping the filtered corrected pixel representations to generate a

8   plurality of potential flaw data streams;

generating a prioritized data stream from the plurality of potential flaw

10   data streams;

generating cross direction location data regarding a location of the

12   prioritized data stream;

generating block data regarding the location of blocks of the prioritized

14   data stream along a machine direction; and

determining actual flaw data from the prioritized data stream of potential

16   flaws utilizing the cross direction location data and the block data.

9. A method for generating a prioritized image data stream from a digitized

2   video stream of a web, the method comprising the steps:

    averaging the digitized video stream over a distance of the web to

4   generate an averaged background signal;

    averaging the digitized video stream over a distance of the web along a

6   machine direction of the web to generate a filtered machine

        direction signal ;

8   averaging the digitized video stream over a distance of the web along a

    cross direction of the web to generate a filtered cross direction

10   signal;

    subtracting the averaged background signal from the filtered machine

12   direction signal to generate a first pixel representation;

    subtracting the averaged background signal from the filtered cross

14   direction signal to generate a second pixel representation;

    grouping the first and second pixel representations to generate at least

16   two data streams of potential flaws; and

    prioritizing the at least two data streams of potential flaws to generate the

18   prioritized image data stream.

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